ATEX-compliant geared motors

G-motion ATEX

G-motion ATEX

Lenze

Lenze

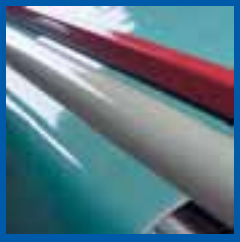
Our commitment to you

If you are looking for effective and easy solutions for the implementation of your machine and drive concepts or want to optimise existing concepts and cut your costs, Lenze is your ideal partner.

We have more than 50 years' experience at the cutting edge of drive and automation technology.





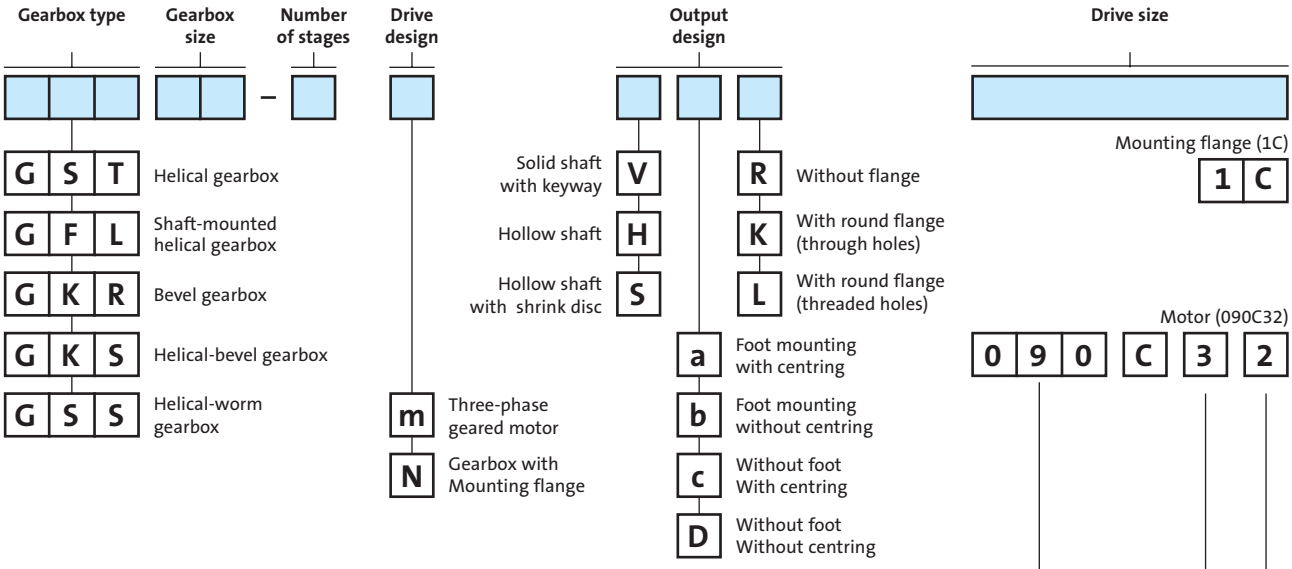



Drive and automation technology set in motion by Lenze – for example in logistics centres, in the textile and printing industry, in the automotive industry or as the driving force behind robots.

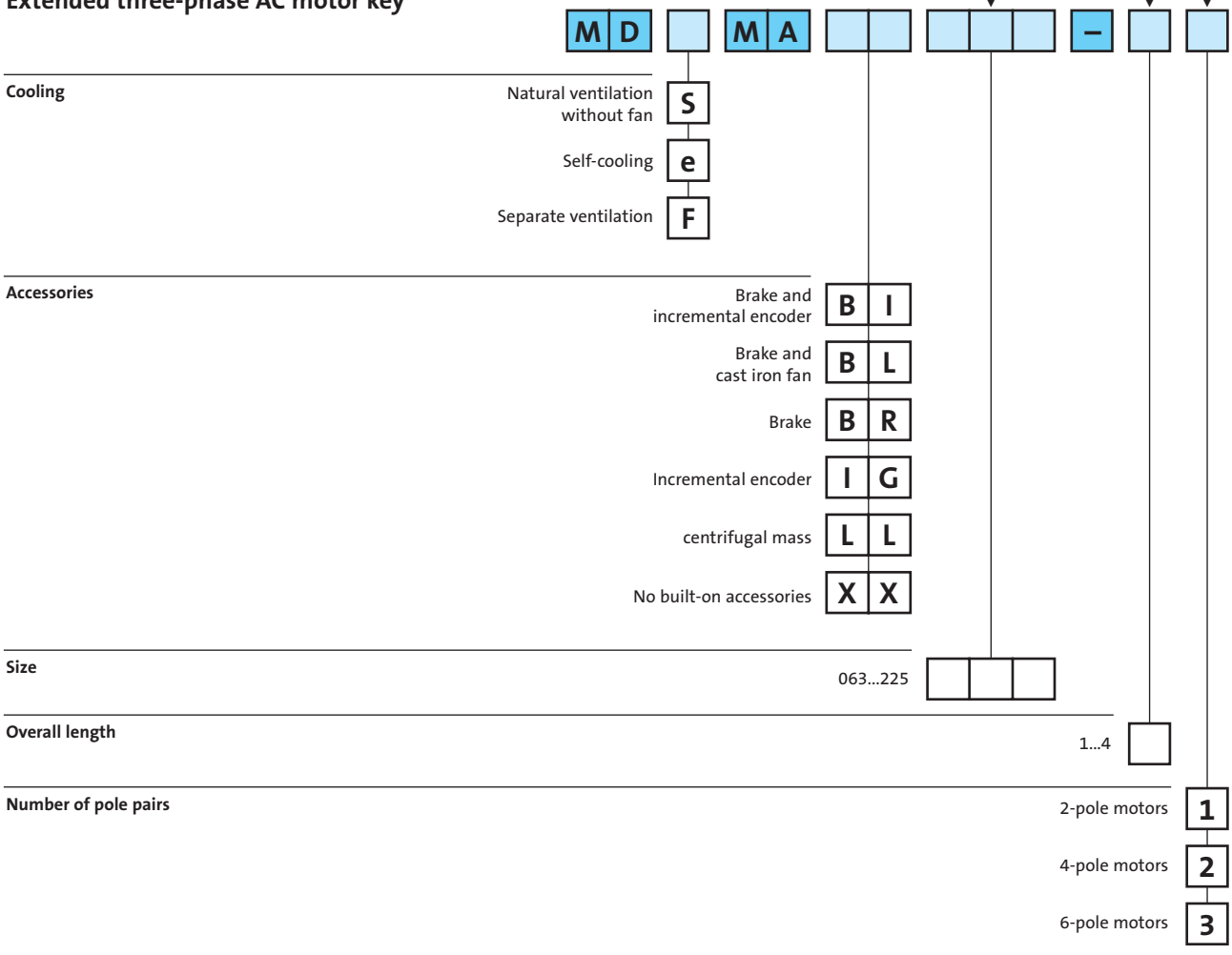
Product key

Geared motors

Type designation



Extended three-phase AC motor key

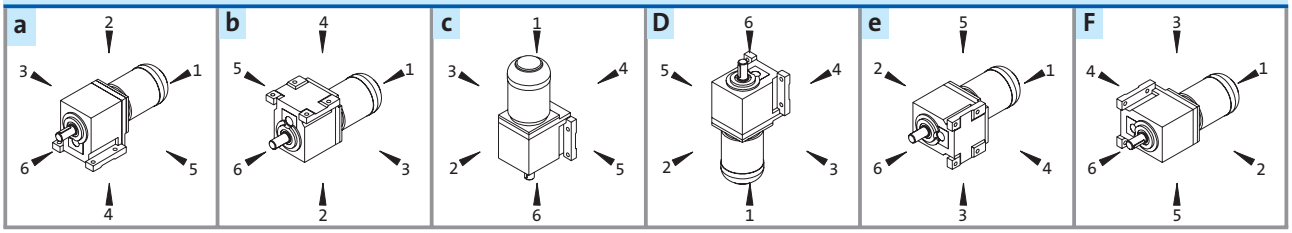


For notes on ordering, sample order and fax orders see Chapter 1.

Mounting position (A-F) and position of system blocks (1-6)

GST

Terminal box: 2, 3, 4, 5
Without terminal box: 0

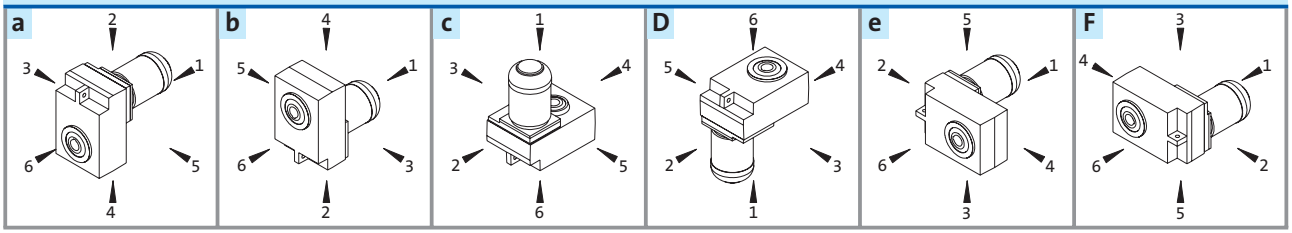


GFL

Solid shaft: 6
Hollow shaft: 0
Hollow shaft with shrink disc: 1, 6

Foot: 3, 4
Without foot: 0

Terminal box: 2, 3, 4, 5
Without terminal box: 0

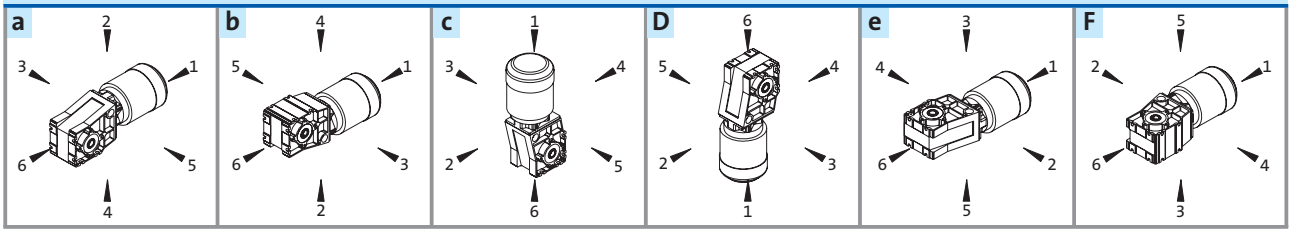


GKR

Solid shaft: 3, 5, 8 (3+5)
Hollow shaft: 0
Hollow shaft with shrink disc: 3, 5

Flange: 3, 5, 8 (3+5)
Without flange: 0

Terminal box: 2, 3, 4, 5
Without terminal box: 0

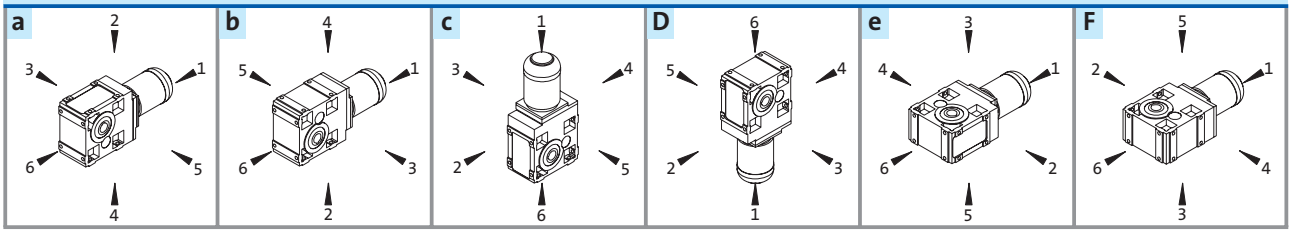


GKS/GSS

Solid shaft: 3, 5, 8 (3+5)
Hollow shaft: 0
Hollow shaft with shrink disc: 3, 5

Flange: 3, 5, 8 (3+5)
Without flange: 0

Terminal box: 2, 3, 4, 5
Without terminal box: 0



A true system

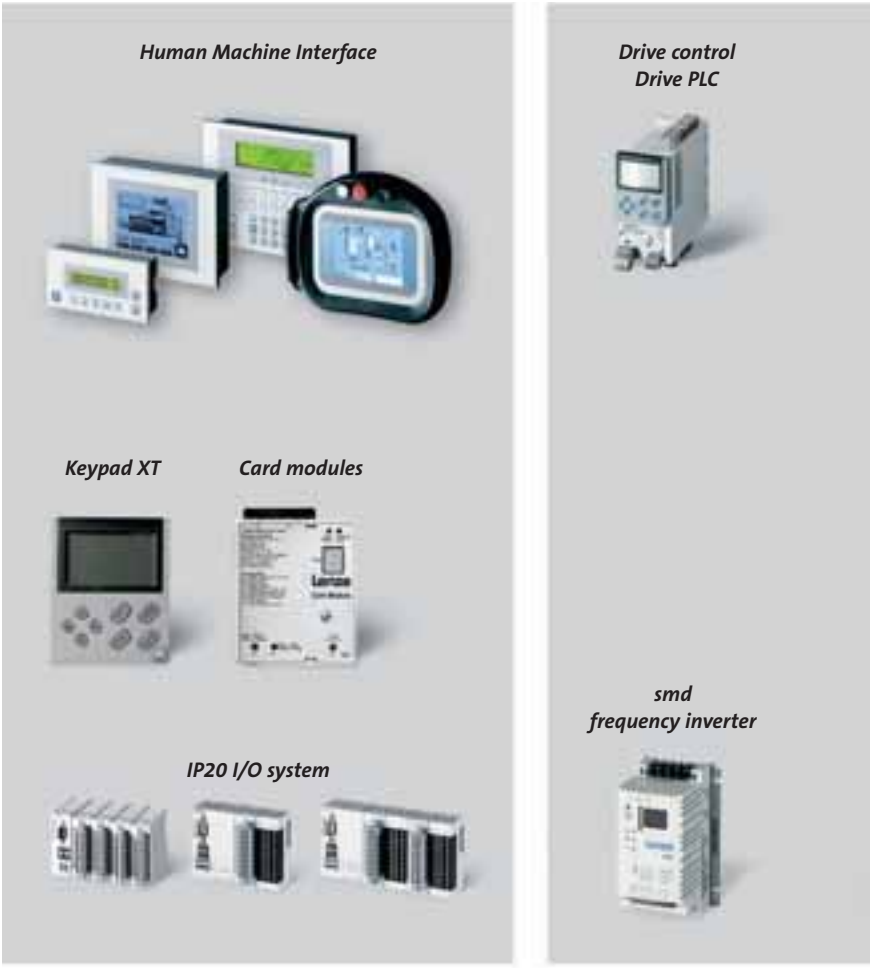
Drive and automation technology

Products which are setting the pace in terms of technology and complete drive solutions for machine and system production - just what Lenze is all about. We provide our customers with frequency and servo inverters with powers up to 400 kW. We support both central control cabinet solutions and decentralised drive concepts, e.g. with motor inverters with IP65 type of protection.

Both standard three-phase AC motors and synchronous and asynchronous servo motors are available to complement the various controllers, all of which can be combined with various types of gearboxes. Human Machine Interfaces, decentralised I/O systems and modules for fieldbus interfacing are also available for exchanging information.

Lenze boasts extensive application know-how in all manner of industries. This knowledge has been applied in the design of the controller and PC software, providing an efficient means of implementing numerous standard applications using simple parameter settings.

An all-round service comprising component selection advice, training, commissioning support and even a helpline which can be accessed all over the world and independent system engineering completes the offer.



9300 servo inverter

ECS servo system for multi-axis application

9300 vector frequency inverter

8200 vector frequency inverter

8200 motec motor inverter

starttec motor starter

Communication modules

Engineering Software

Runtime Software

Servo motors

Small drives

Brakes and clutches

Geared motors | The range

The G-motion range - a tried-and-tested and versatile range of geared motors covering all standard gearbox designs

The G-motion range of geared motors already comes with broad functionality as standard and is available with many useful options at the input and output ends, giving the user great versatility.

Gearbox types

The gearboxes are available as

- Helical gearboxes
- Shaft-mounted helical gearboxes
- Helical-bevel gearboxes
- Helical-worm gearboxes
- Servo planetary gearboxes

Speeds

The large range of gearbox ratios with close spacing makes it possible to closely match the actual drive features to the required process parameters.

Integrated three-phase AC motors

- 4-pole 0.06 to 45 kW
- 2-pole 0.18 to 9 kW
- 6-pole 0.18 to 0.55 kW
- Synchronous servo motors 0.25 to 10 kW
- Asynchronous servo motors 0.8 to 20.3 kW

G-motion const/**G-motion** atex
Geared motors and gearboxes with constant output speeds

- Power range 0.06 to 45 kW
- Torque range ≤ 12000 Nm

G-motion motec
Geared motors with integrated 8200 motec frequency inverter

- Power range 0.12 to 7.5 kW
- Torque range ≤ 12000 Nm

G-motion servo MC/MD

Dynamic geared motors

- Power range 0.25 to 20.3 kW
- Torque range ≤ 12000 Nm

G-motion m-var

Geared motors with mechanical speed control

- Power range 0.25 to 45 kW
- Torque range ≤ 12000 Nm

G-motion EHB

Monorail overhead conveyor geared motors for light and heavy loads

- Power range 0.12 to 5.5 kW
- Torque range ≤ 900 Nm

Contents | G-motion ATEX

General information | G-motion atex

Lenze ATEX-compliant geared motors and gearboxes

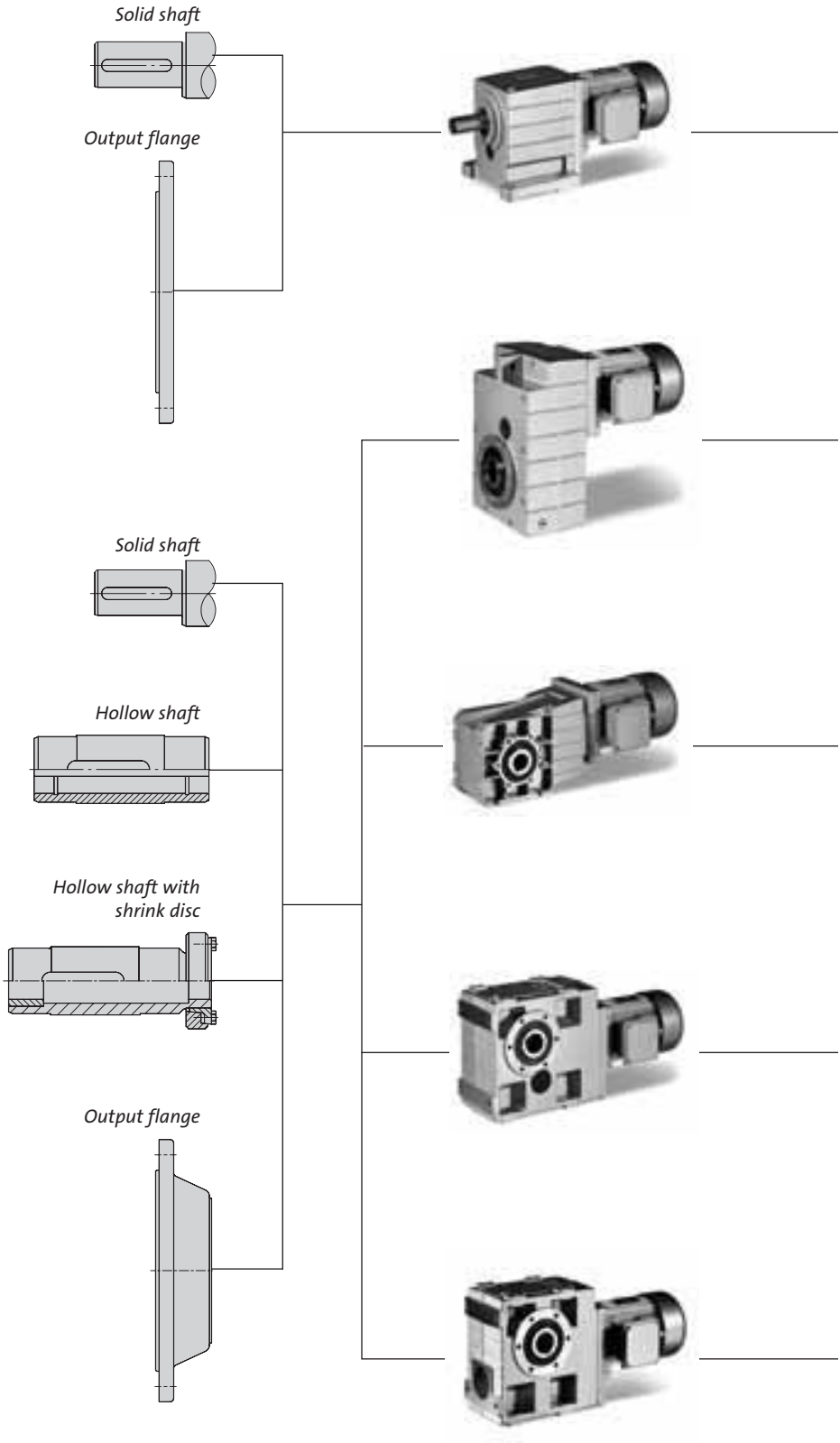
ATEX directives regulate the use of equipment in potentially explosive atmospheres throughout Europe, thus harmonising the various national standards that exist. Not only electrical equipment, but also mechanical, pneumatic and hydraulic devices and device components are critically evaluated in terms of the associated potential for explosion. Previously, such devices had been classified as non-critical system components in respect of explosion protection.

Furthermore, the number of zones for potentially dust explosive atmospheres has been increased from two to three. Against the backdrop of this EU Directive 94/9 EC, in its capacity as a manufacturer Lenze has carried out a comprehensive hazard analysis of its gear case, evaluated the ignition dangers associated with the gearbox and made design adaptations.

Lenze ATEX-compliant gearboxes
Lenze offers drive solutions for use in potentially explosive atmospheres. Users can choose from a comprehensive range of gearboxes and geared motors for use in ATEX categories 2GD and 3GD (dust and gas). Integrated motors can be used where space is at a premium, even for category 2. Thanks to the use of synthetic lubricants and optimised shaft sealing rings, users are provided with a durable geared motor that is easy to maintain.

These gearboxes/geared motors are used in many sectors, including:

- Materials handling technology, logistics, transport
- Building services engineering, including air conditioning
- Packaging technology
- Automotive industry (paint finishing systems)
- Wood working machines
- Chemicals and processing industries
- Municipal facilities (wastewater treatment plants, biogas plants)
- Food, beverages and tobacco industries
- Process engineering



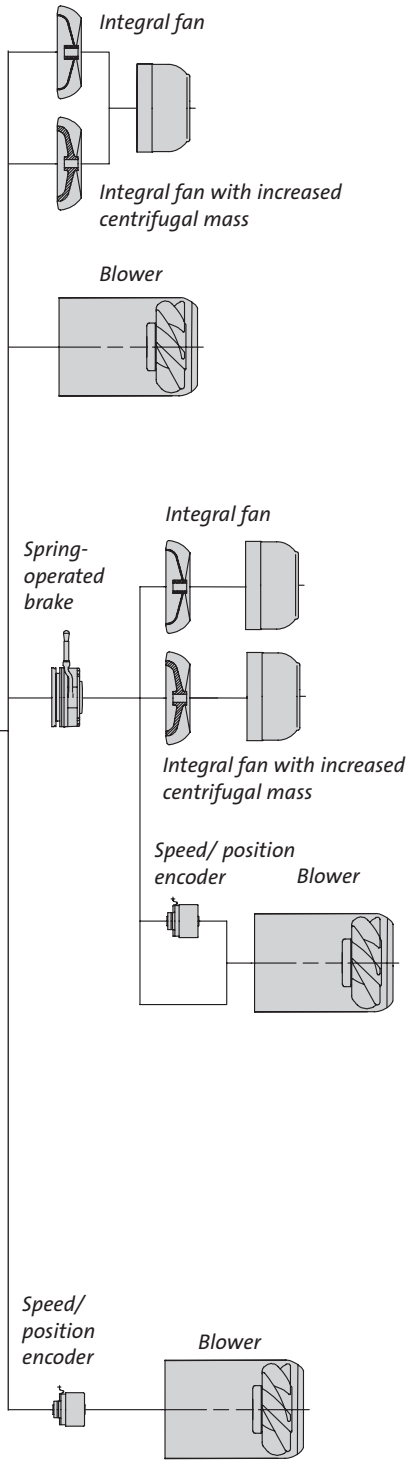
Helical gearboxes/geared motors GST
0.12 to 9 kW - up to 5800 Nm
High permissible radial forces and torques along with closely stepped speed reduction ratios are the key features of these highly economical 1, 2 or 3-stage geared motors, which are of a robust design.

Shaft-mounted helical gearboxes/geared motors GFL
0.12 to 9 kW - up to 9000 Nm
These parallel shaft-type helical gearboxes are primarily used as shaft-mounted gearboxes. As well as offering the possibility of power or torque sharing, the driven shaft is accessible for other applications.

Bevel gearboxes/geared motors GKR
0.12 to 7.5 kW - up to 440 Nm
High efficiency, low weight and wear-free teeth characterise this 2-stage, low-maintenance right-angle gearbox in the lower torque range.

Helical-bevel gearboxes/geared motors GKS
0.12 to 9 kW - up to 11000 Nm
The excellent performance of these 3 and 4-stage built-on right-angle gearboxes is what sets them apart. Thanks to the robust cast iron housing, high permissible torques and closely stepped speed reduction ratios, they can meet even the most stringent of requirements.

Helical-worm gearboxes/geared motors GSS
0.12 to 9 kW - up to 1000 Nm
The low noise 2 and 3-stage helical-worm gearboxes are the perfect compromise between single-stage worm gearboxes, which offer an excellent price/performance ratio, and (helical-)bevel gearboxes, which offer a high degree of efficiency.



Primary and secondary measures

In order for an explosion to take place, a flammable substance (gas, dust, liquid), a sufficient quantity of oxygen and an ignition source all need to be present in the correct mix ratio. There are currently 13 different known such ignition sources, of which only half are electrical. In addition to sparks, arcing or static charges, hot surfaces, mechanically generated sparks and ultrasound all play an important role.

Explosion protection is not just a matter of flammable gases or evaporated liquids. Today, a significant number of explosions can be traced back to the inadequate protection of dust areas. This is why the ATEX directive is much more concerned with dust explosion protection than previous legislation and, under the ATEX directive, the designation and certification of equipment for use in these areas has been substantially expanded.

Primary explosion protection is another important aspect of the ATEX directive. Suitable measures are implemented to prevent explosive atmospheres from forming in the first place. These measures include, for example, the general avoidance of flammable substances and the use of non or hardly combustible raw materials. Additional measures include the inerting of systems, involving the careful use of inert gases to reduce the explosiveness of flammable mixtures. Means of preventative explosion protection include the restriction of emissions and the natural and technical ventilation of production areas.

Explosion-protected equipment

	Device group I Mines, mine gas		Device group II Other potentially explosive atmospheres (gas or dust)					
Category	M1	M2	1		2		3	
Potentially explosive atmospheres [1)]			G	D	G	D	G	D
Zone			0	20	1	21	2	22
Gearbox type of protection					c, k	c, k	c	c

[1)] G = Gaseous atmosphere, D = Dusty atmosphere

Categories and zones

Category	Zone	Degree of protection	Operating conditions/availability
1G	0	Very high	Explosive atmosphere is present frequently and for long periods. Special machine manufacture - not included in the gearbox manufacturer's range of products.
1D	20		
2G [1)]	1	High	Explosive atmosphere is present at intervals. Lenze drive components can be supplied for constant and variable output speeds.
2D [1)]	21		
3G [1)]	2	Normal	Explosive atmosphere is present only rarely and for short periods. Lenze drive components can be supplied for constant and variable output speeds.
3D [1)]	22		

Types of protection

Device type	Type of protection	Standard	Description
Gearbox (mechanical devices)	c [1)]	EN 13463 Part 5	Constructional safety
	k [1)]	EN 13463 Part 8	Liquid immersion

[1)] Sections marked in grey can be provided with Lenze drives.

Explosion-protection motors

	Category 2	Category 3
Gas	**Zone 1/2G** **EEx e type of protection – increased safety** With EC prototype test certificate. When the motor is operated with a frequency inverter, the system (comprising frequency inverter and motor) needs to be acceptance tested.	**Zone 2/3G** **EEx nA type of protection – non-sparking** With EC Declaration of Conformity (manufacturer's declaration). When the motor is operated with a frequency inverter, the system (comprising frequency inverter and motor) needs an EC Declaration of Conformity (manufacturer's declaration).
Dust	**Zone 21/2D** **"2D IP65 T125 °C" type of protection** With EC prototype test certificate. Explosion protection is ensured by the IP enclosure and the max. surface temperature. When the motor is operated with a frequency inverter, the system (comprising frequency inverter and motor) needs to be acceptance tested.	**Zone 22/3D** **"3D IP55 T155°C" type of protection** With EC Declaration of Conformity (manufacturer's declaration). Explosion protection is ensured by the IP enclosure and the max. surface temperature. An IP55 enclosure is used for non-conductive dust; category 2 equipment must be used for conductive dust. When the motor is operated with a frequency inverter, the system (comprising frequency inverter and motor) needs an EC Declaration of Conformity (manufacturer's declaration).

Designation of equipment for use in potentially explosive atmospheres

CE designation

Number of the labelled position

Designation of explosion prevention in accordance with ATEX

Device group
II = Above ground use

Category
2 = For zone 1, 21
3 = For zone 2, 22

Potentially explosive atmosphere
G = Gas
D = Dust

EN European standards

Explosion protection

Type of protection
c = Constructional safety
k = Liquid protection

Explosion group
Required ignition power
IIA = High
IIB = Medium
IIC = Low

Temperature class
Temperature limit
T1 = ≤ 450°C
T2 = ≤ 300°C
T3 = ≤ 200°C
T4 = ≤ 135°C
T5 = ≤ 100°C
T6 = ≤ 85°C

α	[°]	Angle of action of radial force
φ		Ratio step
η	[%]	Mechanical efficiency
η_A	[%]	Mechanical start-up efficiency of gearbox
AC		Alternating current/voltage
c		Load capacity of geared motors
cos$_\varphi$		Power factor of the motor
d_w	[mm]	Pitch circle diameter of transmission element
DC		Direct current/voltage
OT		Operating time
f_α		Effective direction factor at driven shaft
f_r	[Hz]	Rated frequency
f_w	-	Load application factor at output shaft
f_z		Additional radial force factor for transmission element
F_a	[N]	Applied axial force
$F_{a\ Tab}$	[N]	Table value for axial force
$F_{a\ perm}$	[N]	Permissible axial force
F_I		Mass acceleration factor
F_r	[N]	Applied radial force
$F_{r\ Tab}$	[N]	Table value for radial force
$F_{r\ perm}$	[N]	Permissible radial force
h	[m]	Site altitude amsl
i		Ratio
I_B	[A]	Rated brake current
I_A	[A]	Motor starting current
I_r	[A]	Rated current
J_D	[kgm^2]	Moment of inertia of the drive reduced on drive shaft
J_B	[kgm^2]	Moment of inertia of the brake
J_{ext}	[kgm^2]	Moment of inertia of the load reduced on motor shaft
J_{GM}	[kgm^2]	Moment of inertia of the geared motor reduced on motor shaft
J_{motor}	[kgm^2]	Moment of inertia of the motor

k		Application factor (according to DIN 3990)
k_I	-	Intensity of gearbox load capacity
m	[kg]	Mass
M_A	[Nm]	Motor starting torque
M_B	[Nm]	Brake holding torque
M_{stall}	[Nm]	Motor stalling torque
M_r	[Nm]	Rated torque
M_1	[Nm]	Input torque
M_2	[Nm]	Output torque
$M_{2\ perm}$	[Nm]	Permissible output torque
n_r	[rpm]	Rated speed
n_1	[rpm]	Input speed
n_2	[rpm]	Output speed
P_r	[kW]	Rated power
P_1	[kW]	Driving power
$P_{1\ perm}$	[kW]	Permissible drive power
T_{amb}	[°C]	Ambient temperature
U_R	[V]	Rated voltage
U_{mains}	[V]	Mains voltage

CCC	China Compulsory Certification product certification
CE	Communauté Européene
CSA	Canadian Standards Association
DIN	Deutsches Institut für Normung
EMC	Electromagnetic compatibility
EN	European standard
IEC	International Electrotechnical Commission
IM	International Mounting code
IP	International Protection code
NEMA	National Electrical Manufacturers Association
UL	Underwriters Laboratory listed component
UR	Underwriters Laboratory recognised component
USDA	United States Department of Agriculture
VDE	Verband deutscher Elektrotechniker

General information about the data provided in this catalogue

Outputs, torques and speeds

The outputs, torques and speeds specified in the catalogue are rounded values and apply to:

- Operating time/day = 8 h (100% OT)
- Duty class I for up to 10 switching operations/h
- Mounting positions and designs in this catalogue
- Standard lubricant
- f_{mains} = 50 Hz constant
- T_{amb} = 20°C for gearbox
  40°C for motors (in accordance with EN 60034)
- Site altitude < = 1000 m amsl
- The selection tables provide the permissible mechanical powers and torques. For notes on the thermal power limit, see page 2-2.
- The rated power specified for motors and geared motors applies to operating mode S1 (in accordance with EN 60034).
  Under different operating conditions, the values obtained may vary from those listed here.
  In the case of extreme operating conditions, please consult your Lenze sales office.

Load capacity c of gearbox

Characteristic value for the load capacity of Lenze geared motors.

- **c** is the ratio of the permissible rated torque of the gearbox to the rated torque delivered by the drive component (e.g. the integrated Lenze motor).
- **c** must always be greater than the application factor k determined for the application.

Application factor k (corresponding to DIN 3990)

Takes account of the effect of any loads that are actually present and that vary during the anticipated operating time of gearboxes and geared motors.

k depends on

- The type of load
- The load intensity
- Temporal influences

We aim to process your order quickly and accurately. Therefore, please ensure that your order details are complete.
The following checklist and ordering procedure should help.

Checklist
In order to receive the correct products in good time, please provide the following information:
- Your address and order data
- Our product keys for the individual products in this catalogue
- Your delivery details, such as delivery date and delivery address

Ordering procedure
Please use this step-by-step guide and the fax order forms to ensure that you provide all the necessary information in the correct format. It makes ordering your tailor-made drive extremely easy:
- Copy the fax order forms.
  See pages 1-14 to 1-20.
- Enter the order data.
- Post or fax the forms to your Lenze sales office.
  A list of Lenze sales offices can be found at the end of this catalogue.

→ **Cross-reference**
→ Result

1. **Specify Atex category/zone.**
→ **General information, explosion protection** (chapter 1)
Example: **Atex category 3D/zone 22**

2. **Dimension the drive system.**
→ **Drive dimensioning, dimensioning** (chapter 2)

3. **Specify the type designation and ratio.**
→ **Product key** (fold-out page),
selection table (chapter 3-7)
→ Gearbox type, gearbox size, number of stages, example:
GST 07 - 2
Drive design, (motor frame size) drive size, ratio
Example: **M, 100C12, i=44,500**

4. **Specify the output design.**
→ **Product key** (fold-out page),
Drive dimensioning, gearbox designs (chapter 2)
→ Solid shaft with keyway, without foot, with centring ring, with 200 mm round flange **(V, C, K)**

5. **Specify the mounting position and the position of the system blocks.**
→ **Product key** (fold-out page)
Example: **Mounting position A**
Terminal box position 5

6. **Specify the colour.**
→ **Drive dimensioning, gearbox designs** (chapter 2)
Example: **Paint RAL 7012 (basalt grey)**

7. **Specify the gearbox options.**
→ **Drive dimensioning, gearbox designs** (chapter 2)
Example: **Breather elements**

8. **Specify the motor options.**
→ **Drive dimensioning, motor designs** (chapter 2)
Example: **Blower 3~**
Terminal box for blower in position 5

Customer no. | Order no. | **ATEX**

Quantity | Page __

Atex category (zone)	**Geared motor**	**Gearbox** (Note the permissible mounting positions in the selection tables!)
	Temperature class	Temperature class
☐ Atex cat. 2G (zone 1)	T3	T3/T4
☐ Atex cat. 3G (zone 2)	T3	T3/T4
	Permissible maximum temperature	Permissible maximum temperature
☐ Atex cat. 2D (zone 21)	T 190°C	T 190/T 125°C
☒ Atex cat. 3D (zone 22)	T 190°C	T 190/T 125°C

i = **44,500**

G S T | **0 7** | - | ☒ 2 | ☒ m | ☐ n1 = 2800 rpm | ☐ n1 = 1400 rpm | ☐ n1 = 700 rpm | **V** | ☒ c | ☒ K | Flange a_2 = **200** mm | Motor frame size/drive size: **1 0 0 C 1 2**

Other ordering data

Mounting position

a	b	c	D	e	F
☒	☐	☐	☐	☐	☐

Position of system elements

Terminal boxes

2	3	4	5
☐	☐	☐	☒

Colour

☒ Paint RAL 7012 (basalt grey) ☐ Grey primer

Options

Special lubricant

☐ CLP-HC 220 USDA H1 (lubricant approved for the food and beverages industry)

...

Ventilation

☒ Breather elements for **GST 05...07**

☐ compensation reservoir in mounting position C for **GST 09...14**

Motor options for Atex category 3D (zone 22)

Motor connection

Cable entry (only with terminal box KK1)

In position	1	2	3	4	5
	☐	☐	☐	☐	☐

Blower ☐ 1~ ☒ 3~

Terminal box for blower in position	2	3	4	5
	☐	☐	☐	☒

To the Lenze sales office

Page __ of __

☐ **Order**

☐ **Quotation**

Fax no. _____

From

_____
Company

_____
Street/PO Box

_____
City Post code

_____
Date Signature

Customer no.

_____
Order no.

_____
Contact name

_____
Department

_____
Tel. no.

Delivery address (if different)

_____
Street

_____
City Post code

Invoice to (if different)

_____
Street/PO Box

_____
City Post code

Requested delivery date _____

Despatch information _____

Customer no. _____ Order no.

ATEX

Quantity _____ Page __

Atex category (zone)	**Geared motor**	**Gearbox** (Note the permissible mounting positions in the selection tables!)
	Temperature class	Temperature class
☐ Atex cat. 2G (zone 1)	T3	T3/T4
☐ Atex cat. 3G (zone 2)	T3	T3/T4
	Permissible maximum temperature	Permissible maximum temperature
☐ Atex cat. 2D (zone 21)	T 190°C	T 190/T 125°C
☐ Atex cat. 3D (zone 22)	T 190°C	T 190/T 125°C

i = _____

GST ☐☐ - ☐ 1 / ☐ 2 / ☐ 3

☐ m / ☐ N

V

☐ n_1 = 2800 rpm
☐ n_1 = 1400 rpm
☐ n_1 = 700 rpm

☐ a / ☐ b / ☐ c

☐ R / ☐ K / ☐ L

Flange a_2 = _____ mm

Motor frame size (M) _____

Drive size (N) ☐☐

Other ordering data

Mounting position ☐ a ☐ b ☐ c ☐ D ☐ e ☐ F (Note the permissible mounting positions in the selection tables!)

Position of system elements Terminal boxes ☐ 0 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Colour ☐ Paint RAL 7012 (basalt grey) ☐ Grey primer

Options

Special lubricant ☐ CLP-HC 220 USDA H1 (lubricant approved for the food and beverages industry)

Special paint finish RAL _____

Driven shaft bearings ☐ Reinforced bearings for **GST 04...09 - 2**

Ventilation ☐ Breather elements for **GST 05...07** ☐ compensation reservoir in mounting position C for **GST 09...14**

For other ordering data, see the motor options fax order form.

ATEX

Customer no. ☐☐☐☐☐☐☐☐

Order no. _____

Quantity ☐☐☐

Page __

1

Atex category (zone)	Geared motor	Gearbox (Note the permissible mounting positions in the selection tables!)
	Temperature class	Temperature class
☐ Atex cat. 2G (zone 1)	T3	T3/T4
☐ Atex cat. 3G (zone 2)	T3	T3/T4
	Permissible maximum temperature	Permissible maximum temperature
☐ Atex cat. 2D (zone 21)	T 190°C	T 190/T 125°C
☐ Atex cat. 3D (zone 22)	T 190°C	T 190/T 125°C

i = ☐

G F L ☐☐ - ☐ 2 ☐ 3 ☐ m ☐ N

☐ n_1 = 2800 rpm
☐ n_1 = 1400 rpm
☐ n_1 = 700 rpm

☐ V ☐ H ☐ S

☐ a ☐ b ☐ c ☐ D

Hollow shaft d = ☐ mm

☐ R ☐ K

Flange a_2 = ☐ mm

Motor frame size (M) ☐☐☐☐☐☐

Drive size (N) ☐☐

Other ordering data

Mounting position

a	b	c	D	e	F
☐	☐	☐	☐	☐	☐

Position of system elements (mark unspecified positions with 0)

Shaft/shrink disc			Foot			Terminal boxes				
0	6	1	0	3	4	0	2	3	4	5
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Colour

☐ Paint RAL 7012 (basalt grey)

☐ Grey primer

Options

Special lubricant

☐ CLP-HC 220 USDA H1 (lubricant approved for the food and beverages industry)

Special paint finish

RAL ☐

Accessories

☐ Rubber buffer set for torque plate

☐ Shrink disc cover (in position 6 only)

☐ Hollow shaft circlip mounting set

Ventilation

☐ Breather elements for **GFL 05...07**

☐ compensation reservoir in mounting position C for **GFL 09...14**

For other ordering data, see the motor options fax order form.

Customer no. ☐☐☐☐☐☐☐☐

Order no. _____

ATEX

Quantity ☐☐☐☐

Page __

Atex category (zone)	**Geared motor**	**Gearbox** (Note the permissible mounting positions in the selection tables!)
	Temperature class	Temperature class
☐ Atex cat. 2G (zone 1)	T3	T3/T4
☐ Atex cat. 3G (zone 2)	T3	T3/T4
	Permissible maximum temperature	Permissible maximum temperature
☐ Atex cat. 2D (zone 21)	T 190°C	T 190/T 125°C
☐ Atex cat. 3D (zone 22)	T 190°C	T 190/T 125°C

i = ☐☐☐☐

G K R ☐☐ - 2

- ☐ m
- ☐ N
  - ☐ n_1 = 2800 rpm
  - ☐ n_1 = 1400 rpm
  - ☐ n_1 = 700 rpm
- ☐ V
- ☐ H
- ☐ S
- ☐ a
- ☐ b
- Hollow shaft d = ☐☐☐ mm
- ☐ R
- ☐ K
- Flange a_2 = ☐☐☐ mm
- Motor frame size (M) ☐☐☐☐☐☐
- Drive size (N) ☐☐

Other ordering data

Mounting position

a	b	c	D	e	F
☐	☐	☐	☐	☐	☐

Position of system elements (mark non-fixed positions with 0)

	Shaft/shrink disc				Flange				Terminal boxes				
	0	3	5	8	0	3	5	8	0	2	3	4	5
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Colour

☐ Paint RAL 7012 (basalt grey)

☐ Grey primer

Options

Special lubricant

☐ CLP-HC 220 USDA H1 (lubricant approved for the food and beverages industry)

Special paint finish

RAL ☐☐☐☐

Accessories

☐ Rubber buffer set for torque plate (GKR 04 only)

☐ Housing foot torque plate (GKR 05/06 only)

☐ Torque plate pitch circle

☐ Second output shaft end

☐ Hollow shaft circlip mounting set

☐ Shrink disc cover

☐ Hoseproof hollow shaft cover

For other ordering data, see the motor options fax order form.

ATEX

Customer no. ☐☐☐☐☐☐☐☐

Order no. _____

Quantity ☐

Page __

1

Atex category (zone)	Geared motor	Gearbox (Note the permissible mounting positions in the selection tables!)
	Temperature class	Temperature class
☐ Atex cat. 2G (zone 1)	T3	T3/T4
☐ Atex cat. 3G (zone 2)	T3	T3/T4
	Permissible maximum temperature	Permissible maximum temperature
☐ Atex cat. 2D (zone 21)	T 190°C	T 190/T 125°C
☐ Atex cat. 3D (zone 22)	T 190°C	T 190/T 125°C

i = ☐

GKS ☐☐ - ☐ 3 4 ☐ m N ☐ n_1 = 2800 rpm ☐ n_1 = 1400 rpm ☐ n_1 = 700 rpm ☐ V H S ☐ a b ☐ R K ☐ Flange a_2 = ☐ mm Hollow shaft d = ☐ mm

Motor frame size (M) ☐☐☐☐☐☐

Drive size (N) ☐☐

Other ordering data

Mounting position a ☐ b ☐ c ☐ D ☐ e ☐ F ☐

Position of system elements (mark non-fixed positions with 0)

Shaft/shrink disc	Flange	Terminal boxes
0 ☐ 3 ☐ 5 ☐ 8 ☐	0 ☐ 3 ☐ 5 ☐ 8 ☐	0 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Colour ☐ Paint RAL 7012 (basalt grey) ☐ Grey primer

Options

Special lubricant ☐ CLP-HC 220 USDA H1 (lubricant approved for the food and beverages industry)

Special paint finish RAL ☐

Accessories

- ☐ Torque plate on housing foot
- ☐ Torque plate pitch circle
- ☐ Second output shaft end
- ☐ Hollow shaft circlip mounting set
- ☐ Shrink disc cover
- ☐ Hoseproof hollow shaft cover

Ventilation

- ☐ Breather elements for **GKS 05...07**
- ☐ compensation reservoir in mounting position C for **GKS 09...14**

For other ordering data, see the motor options fax order form.

Customer no. ☐☐☐☐☐☐☐☐

Order no. _____

ATEX

Quantity ☐

Page __

Atex category (zone)	**Geared motor**	**Gearbox** (Note the permissible mounting positions in the selection tables!)
	Temperature class	Temperature class
☐ Atex cat. 2G (zone 1)	T3	T3/T4
☐ Atex cat. 3G (zone 2)	T3	T3/T4
	Permissible maximum temperature	Permissible maximum temperature
☐ Atex cat. 2D (zone 21)	T 190°C	T 190/T 125°C
☐ Atex cat. 3D (zone 22)	T 190°C	T 190/T 125°C

i = ☐

GSS ☐☐ -

- ☐ 2 ☐ 3
- ☐ m ☐ N
  - ☐ n_1 = 2800 rpm
  - ☐ n_1 = 1400 rpm
  - ☐ n_1 = 700 rpm
- ☐ V ☐ H ☐ S
  - Hollow shaft d = ☐ mm
- ☐ a ☐ b
- ☐ R ☐ K
  - Flange a_2 = ☐ mm

Motor frame size (M) ☐☐☐☐☐☐

Drive size (N) ☐☐

Other ordering data

Mounting position

a	b	c	D	e	F
☐	☐	☐	☐	☐	☐

Position of system elements (mark non-fixed positions with 0)

	Shaft/shrink disc				Flange				Terminal boxes				
	0	3	5	8	0	3	5	8	0	2	3	4	5
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Colour

☐ Paint RAL 7012 (basalt grey)

☐ Grey primer

Options

Special lubricant

☐ CLP-PG 220 USDA H1 (lubricant approved for the food and beverages industry)

Special paint finish

RAL ☐

Accessories

☐ Torque plate on housing foot

☐ Torque plate pitch circle

☐ Second output shaft end

☐ Hollow shaft circlip mounting set

☐ Shrink disc cover

☐ Hoseproof hollow shaft cover

Ventilation

☐ Breather elements for **GSS 05...07**

For other ordering data, see the motor options fax order form.

Customer no. _____ Order no.

ATEX

Page __

1

Motor options for Atex category 2G, 2D, 3G (zone 1, 21, 2)

Motor protection ☐ PTC

Motor options for Atex category 3D (zone 22)

Motor connection

Cable entry (only with terminal box KK1)

In position 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

Blower ☐

Terminal box for blower in position 2 ☐ 3 ☐ 4 ☐ 5 ☐

Spring-operated brake

Brake size ☐ Supply voltage ☐ V (AC/DC)

Brake options ☐ Low noise design (standard for brake with speed/position encoder)

☐ 6-pole **rectifier**

Speed/position encoder ☐ HTL **incremental encoder** ☐ 512 pulses ☐ 1024 pulses ☐ 2048 pulses

☐ TTL **incremental encoder** ☐ 512 pulses ☐ 1024 pulses ☐ 2048 pulses

Motor protection ☐ PTC ☐ KTY

Additional options ☐ Protection cover

☐ Increased centrifugal mass (cast iron fan)

Note the possible combinations for built-on accessories!

Drive dimensioning | G-motion atex

Dimensioning

Gearbox designs

Motor designs for Atex category 2G, 2D, 3G (zone 1, 21, 2)

Motor designs for Atex category 3D (zone 22)

Power reduction on motor

Influence of site altitude

Influence of site altitude amsl on the rated power				
H [m]	1000	2000	3000	4000
$\frac{P_h}{P_r}$	1	0.95	0.9	0.85

Influence of ambient operating temperature

Influence of the ambient operating temperature T_{amb} on the rated power		
T_{amb} [°C]	-20 to +40	> 40
$\frac{P_v}{P_r}$	1	Please consult your Lenze sales office.

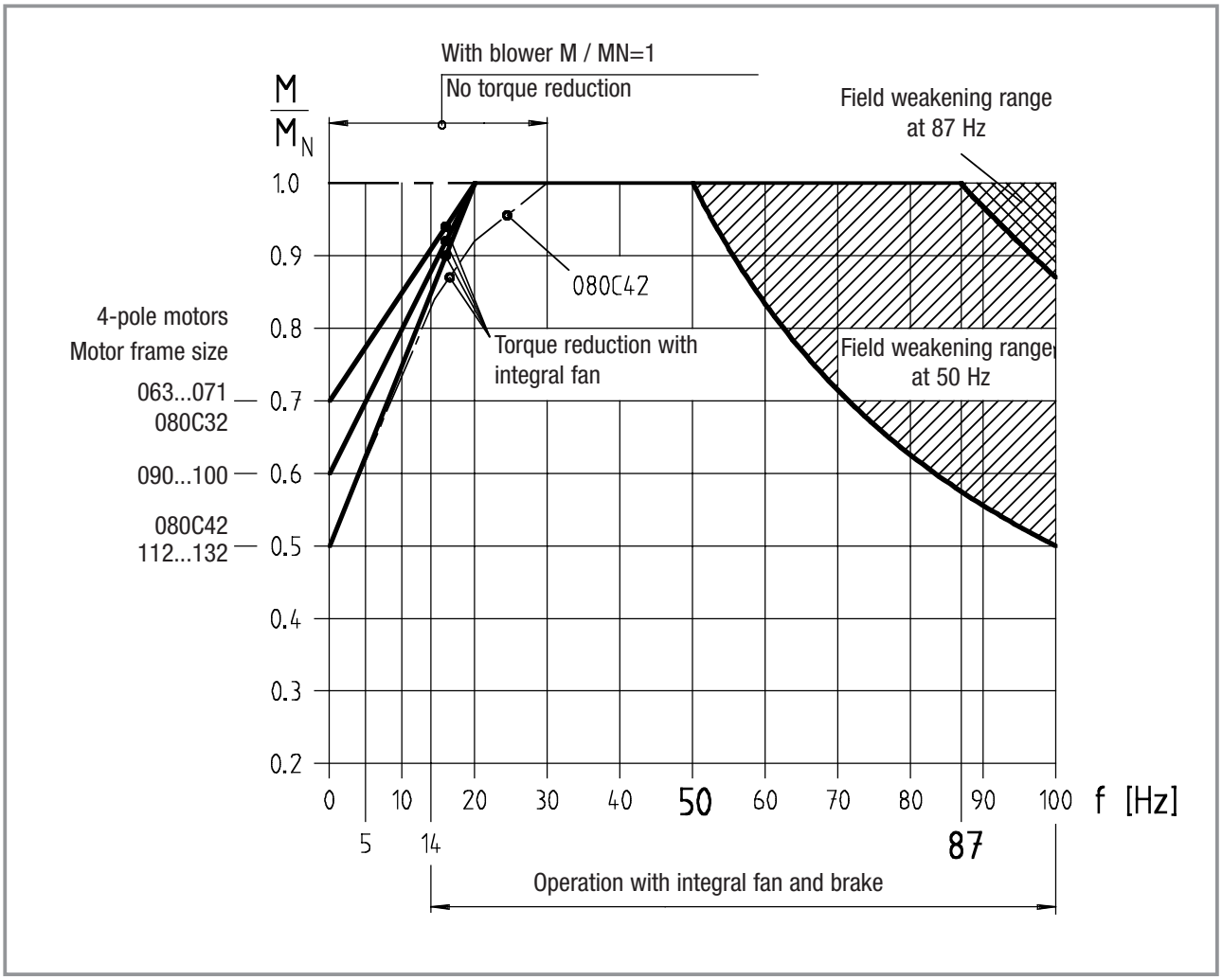
Calculation of reduced power

$$P_{red} = \frac{P_h}{P_r} \cdot \frac{P_v}{P_r} \cdot P_r$$

Torque reduction for 4-pole motors, category 3D

Torque reduction depending on motor frame size, taking the thermal behaviour when operated with a frequency inverter into account.

If the characteristics shown in the diagram below are achieved with self-ventilation, only S2/10 min operation is permitted below 20 Hz.



Thermal power limit

The permissible gearbox continous power is restricted by:

- The mechanical power, defined by the material strength of the individual components or
- The thermal power limit, defined by the heat balance

The thermal power limit may be lower than the mechanical power rating indicated in the selection tables.

The thermal power limit is affected by:

- The churning losses associated with the lubricant. These are determined by the mounting position and circumferential speed of the gears.
- The load and the speed
- The ambient conditions: temperature, air circulation, heat input or dissipation via shafts and the foundation

Please consult the Lenze sales office

- if you are using the following gearbox type, size and ratio combinations at input speed n_1 > 1500 rpm:

Gearbox type	Gearbox size	**Ratios i <**
GST	**07, 09, 11, 14**	10
GFL	**07, 09, 11, 14**	16
GKS	**07, 09, 11, 14**	25

...or if the input speeds n_1 listed are exceeded:

Mounting position	Motor frame size	
	063...100	**112...132**
	Drive size	
	1A...□E	**□F...□G**
A, B, E, F	3000 rpm	3000 rpm
C, D	3000 rpm	1500 rpm

1. Determination of the required load capacity

Specify the torque **M_2** and speed **n_2** required at the output.

↓

Calculate the required motor power $P_1 = \frac{M_2 \cdot n_2}{9550 \cdot \eta}$

↓

Specify the duty class:

↓

Duty class	Duty type	Intensity
I	Smooth running, no or minor shocks	$F_I \leq 1.25$
II	Irregular running, average shocks	$1.25 < F_I \leq 4$
III	Irregular running, major shocks and/or alternating load	$F_I > 4$

F_I (geared motor) = $\frac{J_{ext} + J_{motor}}{J_{motor}}$

F_I (gearbox) = $\frac{J_{ext} + J_A}{J_A}$

↓

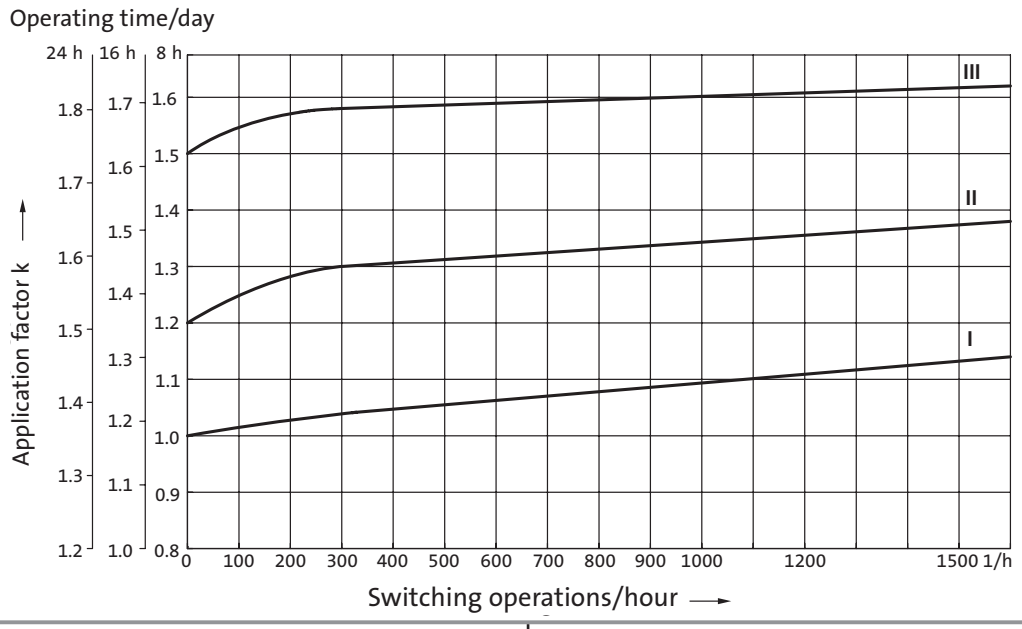
Specify the temporal influences:

- Operating time/day
- Switching operations/hour

↓

Determine the application factor k for the machine from the diagram

↓



↓

Geared motor requirement: c (selection table) ≥ k

Gearbox requirement: $M_{2\,perm}$ (selection table) ≥ $M_2 \cdot k$

2. Calculating the axial and radial forces applied to the gearbox shaft

Determining the available axial and radial forces

Rough calculation of radial forces:

$$F_r = 2000 \cdot \frac{M_2 \cdot f_z}{d_{w\,[mm]}}$$

f_z	Transmission element
1.12	Gears
1.25 ... 1.4	Chain wheels
1.5	Toothed belt pulleys
1.5 ... 2.0	V-belt pulleys depending on pretension

Requirement:

- $F_{rperm} \geq F_r$
  (F_{rperm} from gearbox-specific data)
- $F_{aperm} \geq F_a$
  (F_{aperm} from gearbox-specific data)

General data

		GST	GFL	GKR	GKS	GSS
Housing	Design	Cuboid				
	Material	Aluminium/Cast iron				
Solid shaft	Design	With keyway to DIN 6885				
	Tolerance	k6 (d ≤ 50 mm) m6 (d > 50 mm)				
	Material	Tempered steel C45/42CrMo4				
Hollow shaft	Design	– –	H: With keyway S: Smooth			
	Tolerance	–	Bore H7			
	Material	–	Tempered steel C45			
Toothed parts	Design	Optimised tooth flanks and profile geometry Ground tooth flanks				
	Material	Case-hardened steel				Case-hardened steel, bronze worm gear
Shaft-hub connection		1st stage/prestage/helical (bevel) gearbox: friction-type connection Output stage (= 2nd, 3rd or 4th stage): friction-type or positive-fit connection				
Shaft sealing rings	Design	With dust lip				
	Material	FP (Viton)				
Bearings	Design	Ball bearing/tapered-roller bearing depending on size and design				
Lubricants	Design	In accordance with DIN 51502				
	Fill volumes	Depends on the mounting position ⇨ Operating Instructions				
Mechanical efficiency	At rated torque	$0.95 \le \eta_G \le 0.98$	$0.95 \le \eta_G \le 0.97$	$0.95 \le \eta_G \le 0.96$	$0.93 \le \eta_G \le 0.95$	$0.79 \le \eta_G \le 0.92$ ▶ Dependent on transmission ratio ▶ At n_1 = 1400 rpm ▶ Housing at operating temperature and teeth run in
Noise		Does not exceed the emission values specified in VDI Guideline 2159				
Enclosure		IP65				

Basic designs

Gearbox type	Gearbox size	No. of stages	Drive design	Output design: Shafts [mm] Solid shaft	Shafts [mm] Hollow shaft	Shafts [mm] Hollow shaft with shrink disc	Housing: Foot mounting with centring and threaded pitch circle	Housing: Foot mounting without centring	Housing: With centring and threaded pitch circle	Housing: With pitch circle	Flange [mm]: Without flange	Flange [mm]: With flange (through holes)	Flange [mm]: With flange (threaded holes)	Possible combinations Housing and flange
Product key				V	H	S	A	B	C	D	R	K	L	
GST	04	1	M N	16x32				●	●		●	120/140 160		AR AL BR CR CK
		2		20x40			●	●	●		●	120/140 160	120/140	
	05	1		20x40				●	●		●	120/140 160/200		
		2/3		25x50			●	●	●		●	120/140 160/200	120/140 160	
	06	1		25x50				●	●		●	160/200		
		2/3		30x60			●	●	●		●	160/200	160/200	
	07	1		30x60				●	●		●	200/250		
		2/3		40x80			●	●	●		●	200/250	200/250	
	09	1		40x80				●	●		●	250/300		
		2/3		50x100			●	●	●		●	250/300	250/300	
	11	2/3		60x120			●	●	●		●	300/350	300/350	
	14	2/3		80x160			●	●	●		●	350/400	350/400	
GFL	04	2	M N	25x50	25/30	25/30	Feet in position 3 or 4 Centring and Pitch circle in position 6	Feet in position 3 or 4 Pitch circle in position 6	Centring and Pitch circle in position 6	Pitch circle in position 6	●	160		AR AK BR CR CK DR
	05	2/3		30x60	30/35	35					●	200		
	06	2/3		40x80	40/45	40					●	200 only with **H+S** 250		
	07	2/3		50x100	50/55	50					●	250/300		
	09	2/3		60x120	60/70	65					●	350		
	11	2/3		80x160	70/80	80					●	400/450		
	14	2/3		100x200	100	100					●	450		
GKR	04	2	M N	20x40	20/25	20	Feet in position 4+6 Centring and pitch circle in position 3+5	Feet in position 4+6 pitch circle in position 3+5			●	120/160		AR BR AK
	05	2		30x60	30/35	30/35					●	160/200		
	06	2		35x70	40/45	40					●	200/250		
GKS	04	3	M N	25x50	25/30	25/30	Feet in position 2+4+6 Centring and pitch circle in position 3+5	Feet in position 2+4+6 pitch circle in position 3+5			●	160		AR BR AK
	05	3/4		30x60	30/35	35					●	200		
	06	3/4		40x80	40/45	40					●	200 only with **H+S** 250		
	07	3/4		50x100	50/55	50					●	250/300		
	09	3/4		60x120	60/70	65					●	350		
	11	3/4		80x160	70/80	80					●	400/450		
	14	3/4		100x200	100	100					●	450		
GSS	04	2	M N	25x50	25/30	25/30	Feet in position 2+4+6 Centring and pitch circle in position 3+5	Feet in position 2+4+6 pitch circle in position 3+5			●	160		AR BR AK
	05	2/3		30x60	30/35	35					●	200		
	06	2/3		40x80	40/45	40					●	200 only with **H+S** 250		
	07	2/3		50x100	50/55	50					●	250/300		

Basic designs

Gearbox type	Gearbox size	No. of stages	Drive design	Shaft	Oil control	Ventilation	Lubricants		Colour	
							Synthetic			
Product key				Shaft sealing rings **Viton (FP)**	**Oil-sight glass**	Ventilation units	**CLP HC 320**	**CLP PG 220**	Paint **RAL 7012** (basalt grey)	Grey primer
GST	04	1	M N	●	●		●		●	●
		2								
	05	1								
		2/3				●				
	06	1								
		2/3				●				
	07	1								
		2/3				●				
	09	1				●				
		2/3				●				
	11	2/3				●				
	14	2/3				●				
GFL	04	2	N	●	●		●		●	●
	05	2/3								
	06	2/3								
	07	2/3								
	09	2/3				●				
	11	2/3				●				
	14	2/3				●				
GKR	04	2	M N		●				●	●
	05	2								
	06	2								
GKS		04 3	M N	●	●		●		●	●
	05	3/4								
	06	3/4								
	07	3/4								
	09	3/4				●				
	11	3/4				●				
	14	3/4				●				
GSS	04	2	M N	●	●			●	●	●
	05	2/3								
	06	2/3								
	07	2/3								

Options

Gearbox type	Gearbox size	No. of stages	Drive design	Shaft: 2nd solid shaft end	Shaft: Reinforced shaft bearing	Built-on accessories: Rubber buffer set	Built-on accessories: Torque plate for threaded pitch circle	Built-on accessories: Torque plate for housing foot	Built-on accessories: Hoseproof hollow shaft cover	Built-on accessories: Shrink disc cover	Ventilation: Ventilation units	Ventilation: Compensation reservoir for mounting position C	Lubricants: Approved for the food and beverages industry **CLP HC 220 USDA H1**	Lubricants: Approved for the food and beverages industry **CLP PG 220 USDA H1**	Colour: Special paint according to RAL number
Product key				V											
GST	04	1	M N												
		2			●										
	05	1									●				
		2/3			●						●				
	06	1									●				
		2/3			●						●		●		●
	07	1									●				
		2/3			●						●				
	09	1													
		2/3			●							●/–			
	11	2/3			1)							●/–			
	14	2/3			1)							●/–			
GFL	04	2	M N												
	05	2/3									●				
	06	2/3									●				
	07	2/3			2)	●				● 3)	●		●		●
	09	2/3										●/–			
	11	2/3										●/–			
	14	2/3										●/–			
GKR	04	2	M N			●	●								
	05	2		●			●	●	●	●			●		●
	06	2					●	●	●	●					
GKS	04	3	M N				●								
	05	3/4					●				●				
	06	3/4					●				●				
	07	3/4		●	2)		●	●	●	●	●		●		●
	09	3/4										●/–			
	11	3/4										●/–			
	14	3/4										●/–			
GSS	04	2	M N												
	05	2/3		●	2)		●	●	●	●	●			●	●
	06	2/3									●				
	07	2/3									●				

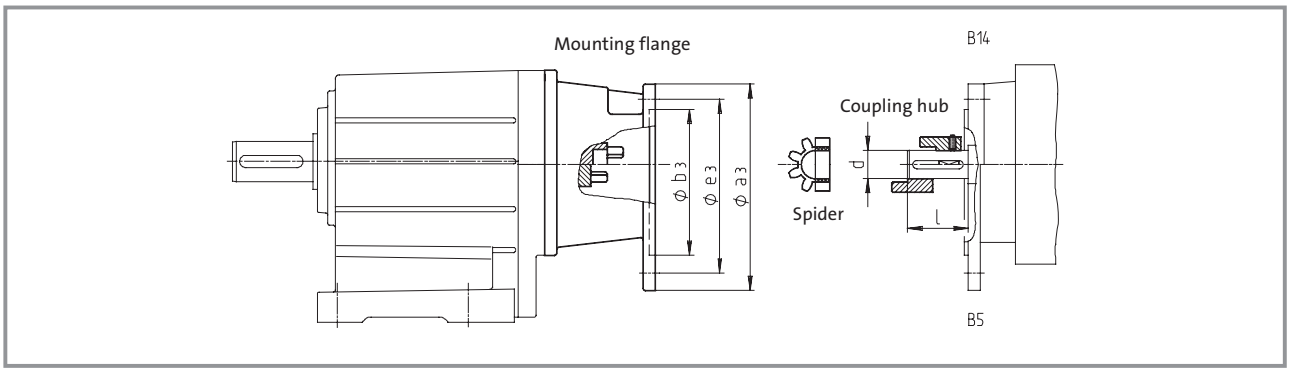
1) Standard bearings
2) On request
3) Only with shrink disc in position 6

Gearbox with mounting flange design N

Mounting flange:
- Flange dimensions suitable for motors in accordance with IEC 72/DIN 42948
- Shaft in two bearings
- Gearbox-side coupling half integrated in the shaft

Spider (ring gear):
- Torsionally stiff
- Isogonal
- Low backlash (backlash-free with clamping hub/ clamping ring hub)

Coupling hub:
- Standard: Coupling hub with keyway for motor shafts in accordance with IEC
- Optional coupling hubs for frequent shocks and load alternation or reduced coupling backlash:
  – Clamping hub with tangential clamping screw for motor shafts with keyway, backlash-free
  – Clamping ring hub for motor shafts without keyway, backlash-free, particularly recommended for servo motors



Geometric assignments for IEC standard motors

See selection tables for gearbox with mounting flange for permissible driving powers and output torques.

IEC motors			Lenze drive size	Coupling hub		Dimensions					
						Mounting flange			Motor shaft		
Size	Design	Flange size		Standard/ clamping hub	Clamping ring hub	Flange a_3	Pitch circle e_3	Centring b_3	d	l_{min}	l_{max}
63	B14	C90	1A/2B	●	●	90	75	60	11	23	23
		C160	6C	●[1]		160	130	110		23	40
71	B14	C105	1B/3C	●	●	105	85	70	14	30	30
		C120	4C			120	100	80		25	40
		C160	2C	●	●	160	130	110		25	40
80	B14	C120	7C	●	●	120	100	80	19	25	40
		C160	1C	●	●	160	130	110		25	40
			2D							40	50
			3E							30	60
90	B14	C160	1D	●		160	130	110	24	50	50
			2E/2F	●	●					30	60
	B5	A200	4E/3F	●	●	188	165	130		50	50
100	B14	C160	1E/1F	●	●	160	130	110	28	30	60
112	B5	A250	2G			250	215	180		60	60
132	B5	A250	3G	●	●	250	215	180	38	80	80
	B5	A300	1G/3H	●	●	300	265	230		80	80
160	B5	A350	1H	●	●	350	300	250	42	110	110
180	B5	A350	2H	●		350	300	250	48	110	110
200	B5	A400	1K	●		400	350	300	55	110	110
225	B5	A450	2K	●		450	400	350	60	140	140

Dimensions in [mm]

[1] Only clamping hub possible

Gearboxes with ventilation

Gearbox size 04 and gearbox type GKR
No ventilation is required for these gearboxes.

Gearbox size 05 to 07
Special measures are not usually required when using these gearbox sizes.

In borderline cases, e.g. at drive speeds >2000 rpm, we recommend that breather elements are used. We can supply these elements if required.

Gearbox size 09 to 14
Ventilation units are always supplied with these gearbox sizes.

Special precautions for mounting position C (motor on top)
We recommend that an oil compensation reservoir is always used with gearbox sizes 09 to 14 in this mounting position. This reservoir can be purchased as an option. See technical data for illustrations and dimensions (Chapter 3...7).

It is not required at high ratios or low input speeds. Please contact Lenze if this affects your application.

Lubricants

Lenze gearboxes and geared motors are supplied ready for operation and filled with a lubricant appropriate for the drive and design in question. You must indicate the mounting position and design on your order in order to ensure that the correct amount of lubricant is supplied.

The lubricants that have been approved for Lenze Atex drives are listed in the lubricant table.

Lubricant table

	Lubricants in accordance with DIN 51517-3: CLP ISO 12925-1: CKC/CKD			
	CLP HC 320	**CLP PG 220**	**CLP HC 220 USDA H1**	**CLP PG 220 USDA H1**
For gearbox type **GST/GFL/GKR/GKS**	●		●	
GSS		●		●
Ambient temperature [°C]	-25 ... +50	-20 ... +40	-20 ... +40	-20 ... +40
Specification	Synthetic-based oil (synthetic hydrocarbon/ poly-alpha-olefin oil)	Synthetic-based oil (polyglycol)	Synthetic-based oil (synthetic hydrocarbon/ poly-alpha-olefin oil)	Synthetic-based oil (polyglycol)
Note		Cannot be mixed with other oil types	For the food and beverages processing industry	For the food and beverages processing industry. Cannot be mixed with other oil types
FUCHS	Fuchs Renolin Unisyn CLP 320			
KLÜBER LUBRICATION	Klübersynth GEM4-320	Klübersynth GH 6-220	Klüberoil 4 UH1-220 N	
Shell	Shell Omala Oil HD 320	Shell Tivela S 220	Shell Cassida Fluid GL 220	Shell Cassida Fluid WG 220

Please contact us if ambient temperatures <-20°C or >40°C apply.

General data

Standards	The motors comply with the current EN and IEC standards. CE conformity in accordance with the Low-Voltage Directive
Operating mode	Designed for operating mode S1 (continuous operation with constant loading at rated power)
Enclosure	Zone 1, 2: IP55 Zone 21: IP65
Temperature class (EN 60034)	Insulation system in accordance with temperature class F
Temperature range	-20 ... +40°C
Installation height	Up to 1000 m above mean sea level without power reduction
Terminal boxes	Motor connection via terminal board
Bearing	Deep-groove ball bearing with 2 shields

Basic designs

Designs	**4-pole motors**					
	063-12 063-32	**071-12 071-32**	**080-12 080-32**	**090-12 090-32**	**100-12 100-32**	**112-22**
Mech. integrated in Lenze gearbox	●	●	●	●	●	●
Integral cooling fan	●	●	●	●	●	●
Enclosure zone 1, 2	IP55	IP55	IP55	IP55	IP55	IP55
zone 21	IP65	IP65	IP65	IP65	IP65	IP65
Terminal box for motor connection	●	●	●	●	●	●

Options

Designs	**4-pole motors**					
	063-12 063-32	**071-12 071-32**	**080-12 080-32**	**090-12 090-32**	**100-12 100-32**	**112-22**
Motor protection PTC thermistor thermal detector[1)]	PTC	PTC	PTC	PTC	PTC	PTC

1) Not as sole protection

General data

Standards	The motors comply with the current EN and IEC standards. CE conformity in accordance with the Low-Voltage Directive
Operating mode	Designed for operating mode S1 (continuous operation with constant loading at rated power)
Enclosure	IP55
Temperature class (EN 60034)	Insulation system in accordance with temperature class F Utilisation in accordance with temperature class B
Insulation resistance	Maximum voltage amplitude Û = 1.5 kV Maximum rate of voltage rise du/dt = 5 kV/µs
Temperature monitoring	Thermal detector (NC contact)
Temperature range	-20...+40°C
Installation height	Up to 1000 m above mean sea level without power reduction
Terminal boxes	Motor connection via terminal board, built-on accessories wired on modular terminal block, rectifier for brake integrated in terminal box
Bearing	Deep-groove ball bearing with 2 shields

Basic designs

Designs	**2-pole motors**						
	063C11 063C31	071C11 071C31	080C11 080C31	090C11 090C31	100C31 100C41	112C31 112C41	132C21
	4-pole motors						
	063C12 063C32 063C42	071C32 071C42	080C32 080C42	090C32	100C12 100C32	112C22 112C32	132C22 132C32
	6-pole motors						
		071C13 071C33	080C13 080C33				
Mech. integrated in Lenze gearbox	●	●	●	●	●	●	●
Integral cooling fan	●	●	●	●	●	●	●
Enclosure IP 55	●	●	●	●	●	●	●
Motor protection thermal detector: Thermal contact (NC contact) [1]	●	●	●	●	●	●	●
Terminal box for motor connection	●	●	●	●	●	●	●

[1] To protect the motor against impermissibly high temperatures and give explosion protection, the thermal contact embedded in the motor winding must be monitored.

Options (Note the possible combinations!)

Designs	2-pole motors						
	063C11 063C31	071C11 071C31	080C11 080C31	090C11 090C31	100C31 100C41	112C31 112C41	132C21
	4-pole motors						
	063C12 063C32 063C42	071C32 071C42	080C32 080C42	090C32	100C12 100C32	112C22 112C32	132C22 132C32
	6-pole motors						
		071C13 071C33	080C13 080C33				
Blower	●	●	●	●	●	●	●
Motor protection PTC thermistor thermal detector [1]	PTC	PTC	PTC	PTC	PTC	PTC	PTC
Continuous thermal detector [1]	KTY	KTY	KTY	KTY	KTY	KTY	KTY
Spring-applied brake, mains or DC connection	●	●	●	●	●	●	●
Low noise	●	●	●	●	●	●	●
Speed/position encoder incremental encoder	●	●	●	●	●	●	●
Further options Increased centrifugal mass (cast iron fan)		●	●	●	●	●	●
Integral fan protection cover	●	●	●	●	●	●	●
Blower protection cover	●	●	●	●	●	●	●

[1] To protect the motor against impermissibly high temperatures and give explosion protection, the thermal contact embedded in the motor winding must also be monitored.

Possible combinations for options

Possible combinations	2-pole motors						
	063C11 063C31	071C11 071C31	080C11 080C31	090C11 090C31	100C31 100C41	112C31 112C41	132C21
Integral fan	●	●	●	●	●	●	●
Integral fan and brake	●	●	●	●	●	●	●
Brake + centrifugal mass		●	●	●	●	●	●
Centrifugal mass		●	●	●	●	●	●
Blower	●	●	●	●	●	●	●
Blower + brake	●	●	●	●	●	●	●

Designs	4-pole motors						
	063C12 063C32 063C42	071C32 071C42	080C32 080C42	090C32	100C12 100C32	112C22 112C32	132C22 132C32
	6-pole motors						
		071C13 071C33	080C13 080C33				
Integral fan	●	●	●	●	●	●	●
Integral fan and brake	●	●	●	●	●	●	●
Brake + centrifugal mass*		●	●	●	●	●	●
Centrifugal mass		●	●	●	●	●	●
Blower	●	●	●	●	●	●	●
Blower and brake	●	●	●	●	●	●	●
Brake + incremental encoder	●	●	●	●	●	●	●
Incremental encoder	●	●	●	●	●	●	●

* Low noise brake

Configuration aid

Option		Function	Possible applications
Cooling	Blower	Enables operation at rated torque at low speeds	- Large setting range for operation at rated torque
Motor protection	Thermal contact, NC contact	Protects the motor against thermal overload	- Monitoring the motor winding temperature - Switching of a motor relay
Holding systems	Spring-applied brake	Brakes the motor	- Decelerating and holding loads - Braking torque is available at zero current
Further options	Protection cover	Protects against foreign bodies falling into the fan cover	- Protecting the air intake port against the entry of foreign bodies if the drive is installed vertically with the motor shaft at the bottom